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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,435	09/30/2003	Peter J. Geiss	BUR920030055US1	2434
23550	7590	01/26/2005	EXAMINER	
HOFFMAN WARNICK & D'ALESSANDRO, LLC			TRAN, BINH X	
3 E-COMM SQUARE			ART UNIT	
ALBANY, NY 12207			PAPER NUMBER	
			1765	

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/605,435

Applicant(s)

GEISS ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19 and 20 is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9-30-2003</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 5, 7, 12 and 15 of claim 9, the phrase "the base" lacks antecedent basis. The examiner suggests replacing "the base" with --the single crystal base--.

In line 1 of claim 15, the phrase "the base" lacks antecedent basis for the same reason as discussed above.

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Claims 10-18 are indefinite because they directly or indirectly depend on indefinite claim 9.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kleinhenz et al. (US 6,074,951) in view of Sakaguchi (US 6,221,738).

Respect to claim 1, Kleinhenz discloses a method of removing silicon dioxide (12) from a surface of a semiconductor device, comprising the steps of:

reacting the silicon dioxide to form a reaction product on the surface (Fig 1, step 4);

removing the reaction product from the surface (Fig 1, step 5).

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Kleinhenz fails to teach annealing the surface. In a semiconductor process, Sakaguchi teaches to anneal the surface to reduce the surface roughness (col. 21 lines 52-55). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kleinhenz in view of Sakaguchi by annealing the surface in order to reduce the surface roughness.

Respect to claims 2-3, Sakaguchi teaches annealing the surface in reducing atmosphere comprises hydrogen (col. 21 lines 52-55). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kleinhenz in view of Sakaguchi by annealing the surface in order to reduce the surface roughness.

Respect to claim 4, Kleinhenz teaches the removing step are performed in an oxygen-free ambient to prevent formation of a native oxide layer (col. 3 lines 25-30). Sakaguchi also teaches the annealing step are performed in oxygen-free ambient.

Respect to claim 5, Sakaguchi teaches to remove material and anneal in the same chamber. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kleinhenz in view of Sakaguchi by using the same process chamber because this would reduce the equipment cost. Further, by processing in the same chamber, a transfer step between chambers can be eliminated.

Respect to claim 6, Sakaguchi teaches the annealing temperature is in the range of 600 °-1400 °C (col. 13 lines 45-50, within applicant's range). Respect to claim 7, Kleinhenz discloses the reacting step is a vapor phase etch (col. 3 lines 25-30). Respect to claim 8, Kleinhenz discloses the removing step comprises evaporating the reaction product from the surface (col. 3 lines 37-43).

***Allowable Subject Matter***

7. Claim 9 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

8. Claims 10-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. Claims 19-20 are allowed.

10. The following is a statement of reasons for the indication of allowable subject matter: The cited prior art fails to disclose either one of the following step in conjunction with all other limitation in the claim: forming a single crystal emitter on the exposed surface of the single crystal base; or forming the first single crystal silicon layer on the surface of the second single crystal silicon layer. The prior art Joshi et al. (US 6,638,819) teaches to form interfacial oxide (332) on the base (320).

***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Joshi et al. (US 6,638,819) teaches to form an interfacial oxide layer on the surface of the base (320).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (571) 272-1469. The examiner can normally be reached on Monday-Thursday and every other Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Binh Tran

Binh X. Tran